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(54) **SECURITY DOCUMENT**

SICHERHEITSDOKUMENT

DOCUMENT DE SÉCURITÉ

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US-A1- 2008 106 091

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Description

[0001] The invention relates to security documents, such as banknotes, and methods for processing those documents.

[0002] A variety of devices have been proposed in the past to help visually impaired users in the recognition of security documents, particularly banknotes. For example, blind people must rely upon their sense of touch to determine the nature and validity of a document, such as through the sensing of a Braille feature.

[0003] Tactile features to assist visually-impaired users in the recognition of security documents have been described in the prior art

[0004] EP1159139 describes security documents, particularly banknotes bearing durable embossings that may be perceived by the sense of touch. The invention disclosed therein seeks to overcome a particular problem that arises in providing tactile indicia, notably the very high rate at which such features are damaged through handling both by the general public and by cash sorting machines employed by banks and other such institutions.

[0005] US2004008871 describes security documents bearing tactually-perceptible alphanumeric characters. The applicant describes a number of ways in which tactile perceptibility might be introduced, including embossing; tactile ink features; the application of textured coatings containing, for example, particulate matter; overlays; and the application of characters having contrasting thermal conductivity or coefficient of friction to that of the substrate.

[0006] Similarly, US2006119096 discloses security documents provided with a variety of tactile features including raised or recessed characters; perforations; areas of contrasting roughness, hardness, elasticity, coefficient of friction, thermal conductivity or stickiness.

[0007] FR-A-2925924 describes a security document such as a banknote including a bright watermark and a security structure having a semi-reflecting zone superimposed on the watermark.

[0008] WO 20091062229 published on 22 May 2009 (after the priority date of the present application) describes a security document having transparent edge windows whose shape varies with different denominations of banknotes.

[0009] In accordance with a first aspect of the present invention, we provide a banknote which is one of a series of banknotes of different denominations, the banknote comprising a polymer substrate having a substantially opaque region defining or carrying indicia relating to the banknote, and a substantially transparent peripheral region wherein the substantially opaque central region has a shape unique to the denomination of the banknote.

[0010] We have appreciated that with partially sighted users, it is possible to take advantage of the fact that they have some viewing capability by providing a substantially opaque secure banknote with a substantially transparent peripheral region. Such a banknote would offer excellent contrast between the transparent and opaque regions provided thereupon enabling partially-sighted users to perceive the distinctive shape of the opaque region silhouetted against the light background visible through the transparent periphery. Such partially sighted users will be able to perceive the edge of the banknote and thus identify the transparent region. Furthermore, the use of a substantially transparent region prevents the generation of a "simple" counterfeit arising from the increasing popularity of colour photocopiers and other imaging systems and the improving technical quality of colour photocopies. In addition the clear transparent region provides a feature that is easily verifiable by the general public. The present invention thus provides a feature that is at once difficult to reproduce whilst also providing tactility and a high visual contrast for recognition by visually impaired users.

[0011] High visual contrast in security documents has been provided in the past by the incorporation of transparent features into an otherwise opaque substrate. However, it has not been recognized in the past that transparent features could be used not only for security purposes but also to assist the partially sighted.

[0012] WO8300659 describes a polymer banknote formed from a transparent substrate comprising an opacifying coating on both sides of the substrate. The opacifying coating is omitted in localised regions on both sides of the substrate to form a transparent region.

[0013] WO0039391 describes a method of making a transparent aperture in a paper substrate. This is achieved by blinding one or more selected areas of a porous support surface, depositing a first layer of paper fibres onto the porous support surface around the blinded areas, bringing an impermeable elongate security thread to lie in contact with the blinded areas of the support surface such that at least the edges of the elongate security thread overlie the deposited layer, and depositing a further layer of paper fibres over the first layer and the impermeable strip to securely embed the edges of the elongate security thread within the paper. The blinded areas are impermeable, which substantially prevents the deposition of fibres thereon before the elongate security thread is laid thereover. Thus, substantially no paper fibres are deposited on one side of the elongate security thread in a central region between edges of the elongate security thread to thereby expose a continuous area of the elongate security thread at a first surface of the paper. Additionally a plurality of discrete translucent or transparent windows is formed in a second surface of the paper in which the elongate security thread is exposed.

[0014] WO95/10419 discloses a security document on which there is a window of a determined shape on which a transparent film is located. The purpose of this window with the transparent film is to make evident when an unauthorised photocopy of a banknote occurs, since the response to light from the transparent material will be different to that of the rest of the banknote.

[0015] An alternative method for forming a transparent

region in a paper document is to apply a transparent film in the form of a patch or a strip over a hole formed in the document either during- or post manufacture of the substrate. Such approaches have been described within the prior art for example EP723501, EP724519 and W003054297.

[0016] Another example of banknote incorporating transparent windows is the commemorative £5 polymer banknote issued on 21 December 1999 by Northern Bank of Northern Ireland.

[0017] In preferred constructions, the substantially transparent peripheral region extends fully around the periphery of the banknote. However, in some cases, the substantially transparent peripheral region may only extend substantially fully around the periphery of the banknote, in other words having some small breaks defined by opaque portions.

[0018] For the purpose of the current invention a transparent region is defined as one whose optical density when measured on a transmission densitometer, with an aperture area equivalent to that of a circle with a 1 mm diameter, is preferably less than 0.3, more preferably less than 0.2 and even more preferably less than 0.1. A suitable transmission densitometer is the MacBeth TD932.

[0019] The contrasting opaque region typically has an optical density when measured on a transmission densitometer, with an aperture area equivalent to that of a circle with a 1 mm diameter, preferably greater than 0.4, more preferably greater than 0.5 and even more preferably greater than 0.6. A suitable transmission densitometer is the MacBeth TD932.

[0020] Preferably, the ratio of the optical density of the substantially transparent peripheral region to the optical density of the substantially opaque central region is no more than 0.6.

[0021] Additional indicia such as micro-text, fine lined filigree patterns, metallised or demetallised indicia, embossings and other similar indicia may be applied to the transparent area of the banknote, provided that there is no significant reduction in the optical contrast between the transparent and opaque regions. In the same manner semi-transparent or transparent optically variable devices may be applied to the transparent area of the banknote for example liquid crystal films or coatings, photonic crystal films or coatings and iridescent coatings.

[0022] Furthermore, additional opaque features including those produced by printing, the application of foils or transfers including those bearing optically variable interference or diffractive structures; and other known security indicia bearing substrates may be applied to either the opaque or transparent regions. In the latter case, the additional opaque feature will be perceived by a partially-sighted user as an additional island of high contrast between the transparent and opaque regions of the banknote.

[0023] Additional security features known in the art such as optically-variable interference or diffractive structures may be incorporated into the banknote such that they may be viewed through the said window area.

[0024] We have also realized that it is possible to utilize transparent regions in banknote to assist banknote sorters to distinguish between banknotes of different denominations. Thus, in accordance with a second aspect of the present invention, a method of operating a banknote sorter to distinguish between banknotes of different denominations, wherein each banknote is one of a series of banknotes of different denominations each including at least one substantially transparent region, the shape and/or location of the transparent region being unique to the denomination of the banknote, the method comprising operating the banknote sorter to detect a transparent region in a banknote being processed, to determine the shape and/or location of the detected transparent region, and to use the detected shape and/or location to identify the denomination of the banknote.

[0025] Conventional banknote sorters typically use information such as the size of the banknote to determine its denomination but this, of course, is not helpful in countries where banknotes all have the same size, such as the US. In those countries, typically pattern recognition is used to detect denomination related indicia on the banknotes. However, in this aspect of the invention, it is possible not only to use transparent windows or other peripheral regions to provide security features and/or benefits to the partially sighted, but also to enable banknote sorters to sort the banknotes according to denomination. The detection of the opaque and transparent regions can be achieved very easily by monitoring variations in intensity of light transmitted through the banknotes as they pass a suitable detector.

[0026] It will be recognized that the inventive concept can be applied more widely than banknotes. Thus in accordance with a third aspect of the present invention, we provide a security document comprising a polymer substrate having a substantially opaque region defining or carrying indicia relating to the document, and a substantially transparent peripheral region. Examples of security documents include vouchers, tickets, gift tokens and the like. The shape of the opaque region can define the value of the security document.

[0027] Some examples of banknotes according to the invention will now be described with reference to the accompanying drawings, in which:-

Figures 1a-1d illustrate schematically a first series of banknotes of different denominations;

Figures 2a-2d are views similar to Figures 1a-1d but of a second example;

Figure 3 illustrates a third example of a banknote according to the invention;

Figure 4 illustrates a fourth example of a banknote according to the invention; and,

Figures 5a and 5b illustrate cross-sections through two further examples of banknotes according to the invention.

[0028] Figure 1 shows examples of a series of secure documents, for example, banknotes of increasing monetary value, according to examples of the current invention in plan-view in transmitted light as they would be viewed by a user or banknote sorting machine. In this example, each secure document or banknote comprises a transparent polymeric substrate 1 onto which is applied an opaque coating in a region 2A-2D. The opaque regions 2A-2D need not be disposed centrally upon the security document 1, nor do they need to be regular, symmetrical nor bounded by straight lines, i.e. polygonal. However, rotationally symmetric designs are to be preferred for their compatibility with cash handling systems. In the present example, the five denomination is represented by an oval printed region 2A; the ten denomination by a rectangle 2B; the twenty denomination by a hexagon 3C; and the fifty denomination by a parallelogram 2D. Each opaque region is fully surrounded by a transparent region 3A-3D. Each opaque region typically has an optical density when measured on a transmission densitometer, with an aperture area equivalent to that of a circle with a 1 mm diameter, preferably greater than 0.4, more preferably greater than 0.5 and even more preferably greater than 0.6. Each transparent region 3A-3D typically has an optical density when measured on a transmission densitometer, with an aperture area equivalent to that of a circle with a 1 mm diameter, preferably less than 0.3, more preferably less than 0.2 and even more preferably less than 0.1. The high contrast obtained between the printed opaque and transparent regions of documents prepared according to the present teaching is readily apparent and is typically no more than 0.6.

[0029] In order to identify the denomination of one of these banknotes, it can be held up to a light so that light is transmitted through the transparent region of the banknote and the distinctive shape of the opaque region will be readily recognized even by a partially sighted person.

[0030] Figure 2 shows a further embodiment of the current invention where the documents have the same main opaque regions 2A-2D as in Figure 1 but additionally the 5 denomination document has two opaque islands 4A within the transparent periphery 2A (Figure 2a), and the 10, 20 and 50 denomination documents have a transparent window area 5B-5D wholly enclosed within the opaque region of the document as with conventional polymeric banknotes.

[0031] Figures 3 and 4 show similar documents but where the transparent periphery comprises micro-text 6 (Figure 3 not shown to scale) and fine line detail 7 (Figure 4 not shown to scale) respectively.

[0032] The opaque regions 2A-2D can be in the form of a coating applied by any conventional printing process, but typically this is a gravure printing process. The opaque coating may comprise a single layer applied to one side of the transparent substrate 1 or one or more layers (10A,10B Figure 5a; 11A-11D Figure 5b) applied to both sides of the transparent substrate. The opaque coating is omitted in one or more regions of the document to provide a transparent periphery and, optionally, additional transparent areas of the secure document.

[0033] Figure 5 illustrates examples of the documents in cross-section. Figure 5a illustrates an example where the transparent periphery 3 (corresponding to 3A-3D in Figure 1) is formed by omitting the opaque pigmented coatings in that region and thus fully exposing the transparent polymeric substrate. In a further example, illustrated in Figure 5b, the transparent periphery 3 only has one layer 11B of pigmented coating while the remainder of the document has four layers. The coating in the transparent periphery must be sufficiently light transmitting that the optical density of the region does not exceed 0.3.

[0034] The opaque coating of the secure document, such as a banknote, then undergoes further standard security printing processes including one or more of the following; wet or dry lithographic printing, intaglio printing, letterpress printing, flexographic printing, screen-printing, and/or gravure printing.

[0035] A transparent periphery or other transparent window also enables the transparent region to be easily detected by transmitted light detectors on cash handling equipment, I n some detector systems however it may be difficult to differentiate between the edge of the document and the transparent periphery and the detector may inaccurately interpret the transparent periphery as the edge of a document having an incorrect length. This problem may simply be overcome by programming the detector to recognise the length of the opaque region rather than the length of the full document. Alternatively, unlike a void, the polymeric substrate forming the periphery will reflect a fraction of the incident light and this reflected light could be detected by a second detector to confirm that this is part of the document and not an edge. A similar method for determining the presence of enclosed transparent regions in polymer banknotes is described in US20030043365.

[0036] In a further embodiment, to avoid confusion with the edge of the note, the transparent periphery can be provided with an optical structure which provides a scattering or diffusing screen. This will reduce the level of transmitted light below that observed for a fully transparent substrate or a void, but the level of transmitted light will still be such that a significant portion of light can pass through the screen and activate the detectors.

Claims

1. A banknote which is one of a series of banknotes of different denominations, the banknote comprising a substrate having a substantially opaque region defining or carrying indicia relating to the banknote, **characterized in that** the substrate is a polymer substrate **in that** the substrate has a substantially transparent peripheral region wherein the substantially opaque central region has a shape unique to the denomination of the banknote; and **in that** the

optical density of the peripheral region when measured on a transmission densitometer, with an aperture area equivalent to that of a circle with a 1 mm diameter, is less than 0.3, preferably less than 0.2 and even more preferably less than 0.1.

2. A banknote according to claim 1, wherein the substantially opaque central region has a regular geometric shape such as one of a regular polygon including a square, hexagon or parallelogram, a circle or oval.

3. A banknote according to claim 1 or claim 2, wherein the substantially transparent peripheral region extends fully along at least one edge of the banknote.

4. A banknote according to claim 3, wherein the substantially transparent peripheral region extends around, preferably substantially fully around, the periphery of the banknote.

5. A banknote according to any of the preceding claims, wherein the substantially opaque region is located centrally of the banknote.

6. A banknote according to any of the preceding claims, wherein the optical density of the substantially opaque region when measured on a transmission densitometer, with an aperture area equivalent to that of a circle with a 1 mm diameter, is greater than 0.4, preferably greater than 0.5 and even more preferably greater than 0.6.

7. A banknote according to any of the preceding claims, wherein the ratio of the optical density of the substantially transparent peripheral region to the optical density of the substantially opaque region is no more than 0.6.

8. A banknote according to any of the preceding claims, wherein the substantially transparent peripheral region includes one or more security features, for example indicia such as micro-text, fine lined filigree patterns, metallised or demetallised indicia, embossings or semi-transparent or transparent optically variable devices such as liquid crystal films or coatings, photonic crystal films or coatings and iridescent coatings.

9. A banknote according to any of the preceding claims, wherein the substantially transparent peripheral region includes one or more substantially opaque features.

10. A banknote according to any of the preceding claims, wherein the substantially opaque region includes one or more transparent regions, optionally including one or more security features.

11. A banknote according to any of the preceding claims, wherein the substantially opaque region is formed by one or more coatings on the substrate, and wherein the substantially transparent peripheral region has no coatings provided on the substrate.

12. A document according to any of claim 1 to 10, wherein the substantially opaque region is formed by two or more coatings on the substrate, and wherein the substantially transparent peripheral region includes one coating on the substrate.

13. A series of banknotes of different denominations, each banknote being constructed according to any of the preceding claims, wherein the substantially opaque region of each banknote has a shape unique to the denomination of the banknote.

14. A method of operating a banknote sorter to distinguish between banknotes of different denominations, wherein each banknote is one of a series of banknotes of different denominations, each banknote being in accordance with any of claims 1 to 13, the method comprising operating the banknote sorter to detect a transparent region in a banknote being processed, determine the shape and/or location of the detected transparent region, and use the detected shape and/or location to identify the denomination of the banknote.

Patentansprüche

1. Banknote, die eine einer Reihe von Banknoten verschiedener Nennbeträge ist, wobei die Banknote ein Substrat umfasst, das einen im Wesentlichen opaken Bereich aufweist, der Zeichen definiert oder trägt, die sich auf die Banknote beziehen, **dadurch gekennzeichnet, dass** das Substrat ein Polymersubstrat ist, in dem das Substrat einen im Wesentlichen transparenten peripheren Bereich aufweist, wobei der im Wesentlichen opake mittige Bereich eine Form aufweist, die für den Nennbetrag der Banknote einzigartig ist; und dadurch, dass die optische Dichte des peripheren Bereich, wenn auf einem Transmissionsdensitometer mit einer Öffnungsfläche gemessen, die jener eines Kreises mit einem Durchmesser von 1 mm entspricht, weniger als 0,3, vorzugsweise weniger als 0,2 und noch bevorzugter weniger als 0,1 beträgt.

2. Banknote nach Anspruch 1, wobei der im Wesentlichen opake mittige Bereich eine regelmäßige geometrische Form, wie beispielsweise eine eines regelmäßigen Polygon einschließlich eines Quadrats, eines Sechsecks oder Parallelogramms, eines Kreises oder Ovals aufweist.

3. Banknote nach Anspruch 1 oder Anspruch 2, wobei sich der im Wesentlichen transparente periphere Bereich vollständig entlang einer Kante der Banknote erstreckt.

4. Banknote nach Anspruch 3, wobei sich der im Wesentlichen transparente periphere Bereich um die Peripherie der Banknote herum, vorzugsweise vollständig drum herum, erstreckt.

5. Banknote nach einem beliebigen der vorangehenden Ansprüche, wobei sich der im Wesentlichen opake Bereich mittig der Banknote befindet.

6. Banknote nach einem beliebigen der vorangehenden Ansprüche, wobei die optische Dichte des im Wesentlichen opaken Bereichs, wenn auf einem Transmissionsdensitometer mit einer Öffnungsfläche gemessen, die jener eines Kreises mit einem Durchmesser von 1 mm entspricht, größer als 0,4, vorzugsweise größer als 0,5 und noch bevorzugter größer als 0,6 ist.

7. Banknote nach einem beliebigen der vorangehenden Ansprüche, wobei das Verhältnis der optischen Dichte des im Wesentlichen transparenten peripheren Bereichs zur optischen Dichte des im Wesentlichen opaken Bereichs nicht mehr als 0,6 beträgt.

8. Banknote nach einem beliebigen der vorangehenden Ansprüche, wobei der im Wesentlichen transparente periphere Bereich ein oder mehrere Sicherheitsmerkmale, zum Beispiel Zeichen, wie beispielsweise Mikrotext, Filigranmuster aus feinen Linien, metallisierte oder demetallisierte Zeichen, Embossierungen oder halbtransparente oder transparente optisch variierbare Einrichtungen wie beispielsweise Flüssigkristallfilme oder Beschichtungen, photonische Kristallfilme oder Beschichtungen und irisierende Beschichtungen einschließt.

9. Banknote nach einem beliebigen der vorangehenden Ansprüche, wobei der im Wesentlichen transparente periphere ein oder mehrere im Wesentlichen opake Merkmale einschließt.

10. Banknote nach einem beliebigen der vorangehenden Ansprüche, wobei der im Wesentlichen opake Bereich einen oder mehrere transparente Bereiche einschließt, die optional ein oder mehrere Sicherheitsmerkmale einschließen.

11. Banknote nach einem beliebigen der vorangehenden Ansprüche, wobei der im Wesentlichen opake Bereich durch eine oder mehrere Beschichtungen auf dem Substrat gebildet ist und, wobei für den im Wesentlichen transparenten peripheren Bereich keine Beschichtungen auf dem Substrat bereitgestellt sind.

12. Dokument nach einem beliebigen der Ansprüche 1 bis 10, wobei der im Wesentlichen opake Bereich durch zwei oder mehrere Beschichtungen auf dem Substrat gebildet ist und, wobei der im Wesentlichen transparente periphere Bereich eine Beschichtung auf dem Substrat einschließt.

13. Reihe von Banknoten verschiedener Nennbeträge, wobei jede Banknote nach einem beliebigen der vorangehenden Ansprüche konstruiert ist, wobei der im Wesentlichen opake Bereich jeder Banknote eine Form aufweist, die für den Nennbetrag der Banknote einzigartig ist.

14. Verfahren zum Betreiben einer Banknotensortiermaschine, um zwischen Banknoten verschiedener Nennbeträge zu unterscheiden, wobei jede Banknote eine einer Reihe von Banknoten verschiedener Nennbeträge ist, jede Banknote in Übereinstimmung mit einem beliebigen der Ansprüche 1 bis 13 ist, wobei das Verfahren das Betreiben der Banknotensortiermaschine umfasst, um einen transparenten Bereich in einer zu verarbeitenden Banknote zu detektieren, die Form und/oder Stelle des detektierten transparenten Bereichs zu ermitteln und die detektierte Form und /oder Stelle zu verwenden, um den Nennbetrag der Banknote zu identifizieren.

Revendications

1. Billet de banque qui fait partie d'une série de billets de banque de différentes valeurs, le billet de banque comportant un support ayant une région sensiblement opaque définissant ou portant des marques se rapportant au billet de banque, **caractérisé en ce que** le support est un support en polymère, **en ce que** le support a une région périphérique sensiblement transparente, dans lequel la région centrale sensiblement opaque a une forme propre à la valeur du billet de banque ; et **en ce que** la densité optique de la région périphérique, quand elle est mesurée sur un densitomètre à transmission, avec une superficie d'entrée équivalente à celle d'un cercle ayant un diamètre de 1 mm, est inférieure à 0,3, de préférence inférieure à 0,2 et encore plus de préférence inférieure à 0,1.

2. Billet de banque selon la revendication 1, dans lequel la région centrale sensiblement opaque a une forme géométrique régulière telle une forme parmi un polygone régulier y compris un carré, un hexagone ou un parallélogramme, un cercle ou un ovale.

3. Billet de banque selon la revendication 1 ou la revendication 2, dans lequel la région périphérique

sensiblement transparente s'étend entièrement le long d'au moins un bord du billet de banque.

4. Billet de banque selon la revendication 3, dans lequel la région périphérique sensiblement transparente s'étend autour, de préférence sensiblement entièrement autour, de la périphérie du billet de banque.

5. Billet de banque selon l'une quelconque des revendications précédentes, dans lequel la région sensiblement opaque est située de manière centrale sur le billet de banque.

6. Billet de banque selon l'une quelconque des revendications précédentes, dans lequel la densité optique de la région sensiblement opaque, quand elle est mesurée sur un densitomètre à transmission, avec une superficie d'entrée équivalente à celle d'un cercle ayant un diamètre de 1 mm, est supérieure à 0,4, de préférence supérieure à 0,5 et encore plus de préférence supérieure à 0,6.

7. Billet de banque selon l'une quelconque des revendications précédentes, dans lequel le rapport entre la densité optique de la région périphérique sensiblement transparente et la densité optique de la région sensiblement opaque ne fait pas plus de 0,6.

8. Billet de banque selon l'une quelconque des revendications précédentes, dans lequel la région périphérique sensiblement transparente comprend un ou plusieurs éléments de sécurité, par exemple des marques telles des microformes, des motifs de filigrane à haute linéature, des marques métallisées ou démétallisées, des gaufrages ou des dispositifs semi-transparents ou transparents optiquement variables tels des revêtements ou des films à cristaux liquides, des revêtements ou des films à cristaux photoniques et des revêtements irisés.

9. Billet de banque selon l'une quelconque des revendications précédentes, dans lequel la région périphérique sensiblement transparente comprend un ou plusieurs éléments sensiblement opaques.

10. Billet de banque selon l'une quelconque des revendications précédentes, dans lequel la région sensiblement opaque comprend une ou plusieurs régions transparentes, comprenant éventuellement un ou plusieurs éléments de sécurité.

11. Billet de banque selon l'une quelconque des revendications précédentes, dans lequel la région sensiblement opaque est formée par un ou plusieurs revêtements sur le support, et dans lequel la région périphérique sensiblement transparente n'a aucun revêtement mis en oeuvre sur le support.

12. Document selon l'une quelconque des revendications 1 à 10, dans lequel la région sensiblement opaque est formée par deux ou plusieurs revêtements sur le support, et dans lequel la région périphérique sensiblement transparente comprend un revêtement sur le support.

13. Séries de billets de banque de différentes valeurs, chaque billet de banque étant construit selon l'une quelconque des revendications précédentes, dans lequel la région sensiblement opaque de chaque billet de banque a une forme propre à la valeur du billet de banque.

14. Procédé de fonctionnement d'une machine à trier des billets de banque permettant de faire la distinction entre des billets de banque de différentes valeurs, dans lequel chaque billet de banque fait partie d'une série de billets de banque de différentes valeurs, chaque billet de banque étant conforme selon l'une quelconque des revendications 1 à 13, le procédé comportant le fonctionnement de la machine à trier des billets de banque permettant de détecter une région transparente dans un billet de banque en cours de traitement, de déterminer la forme et/ou l'emplacement de la région transparente détectée, et d'utiliser la forme détectée et/ou l'emplacement détecté pour identifier la valeur du billet de banque.

Fig.1a.

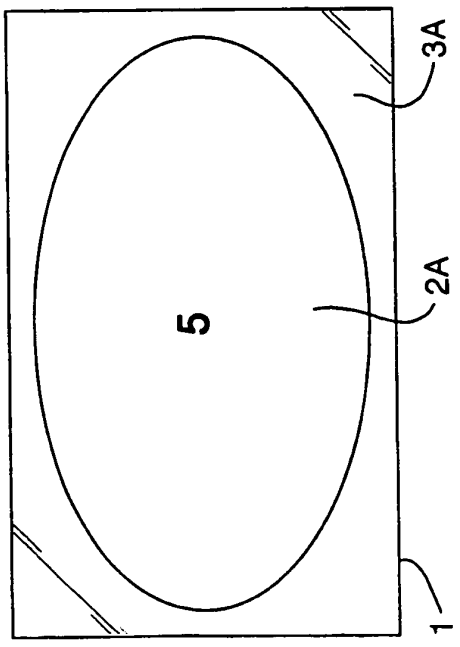


Fig.1b.

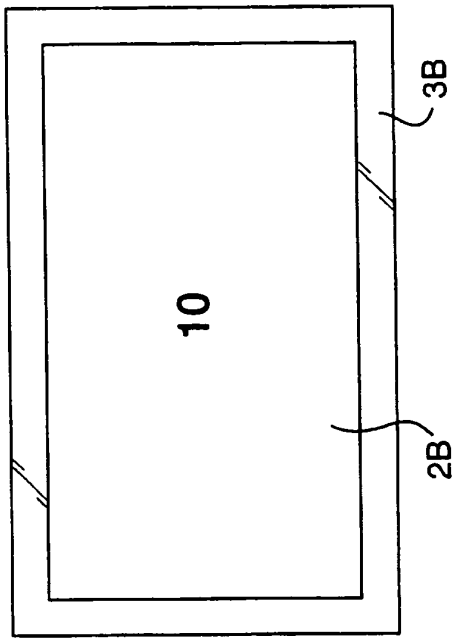


Fig.1c.

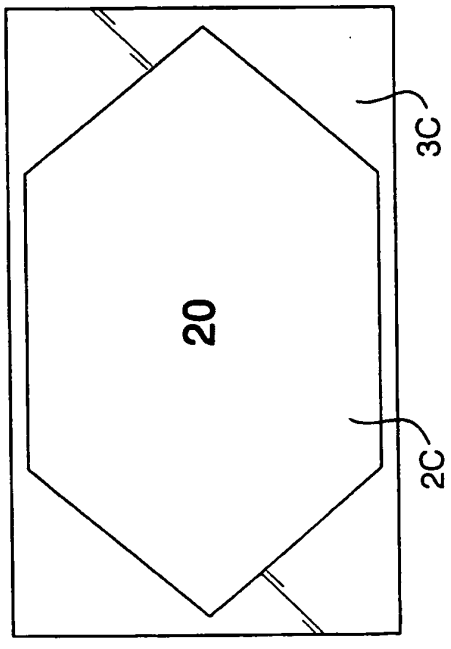
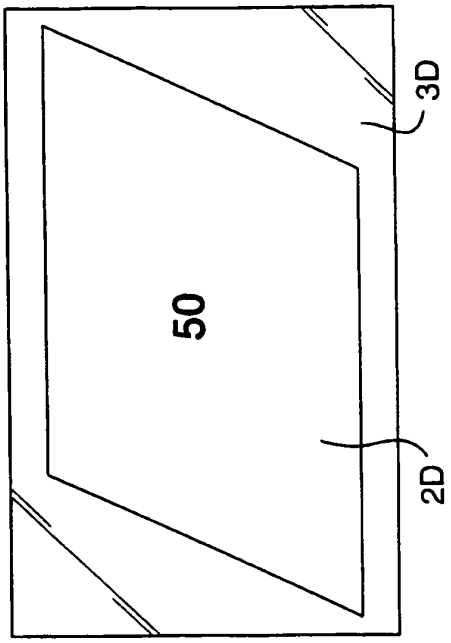


Fig.1d.



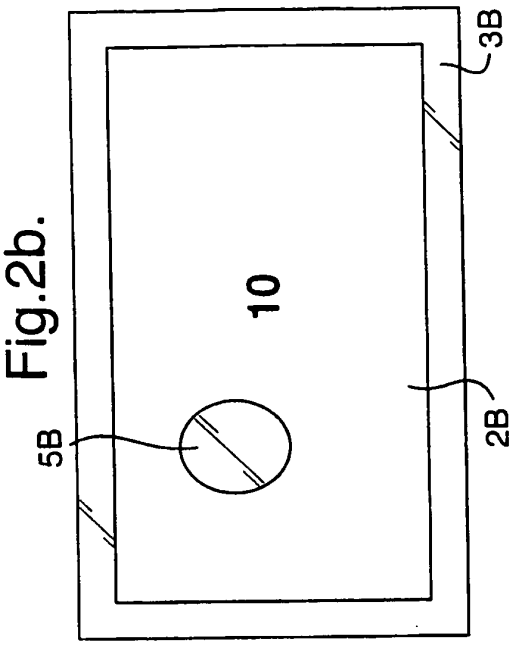


Fig.2b.

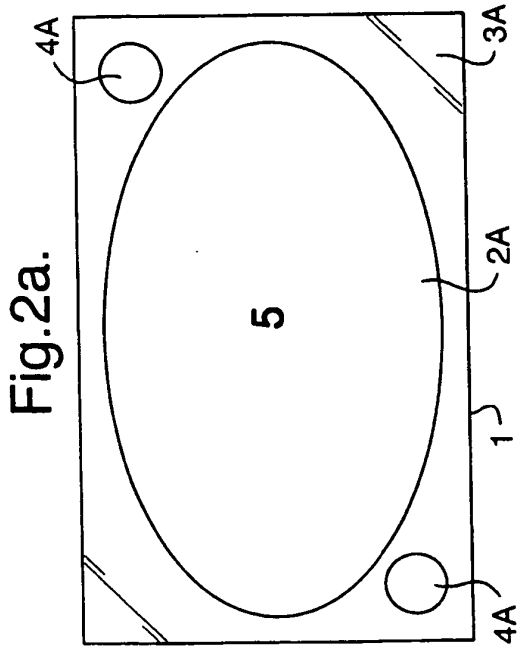


Fig.2a.

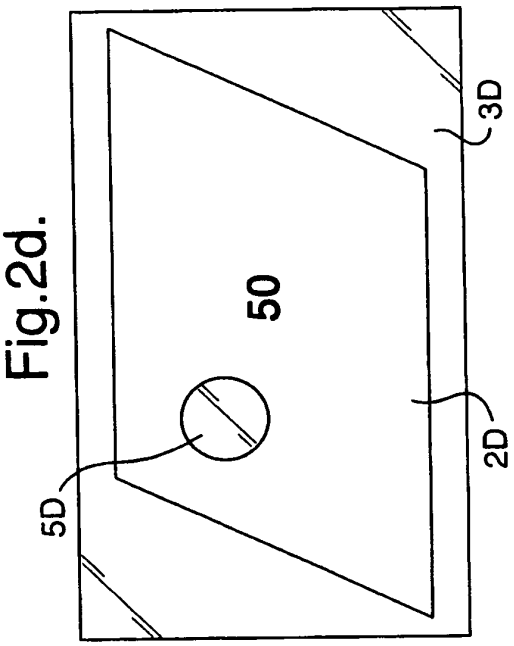


Fig.2d.

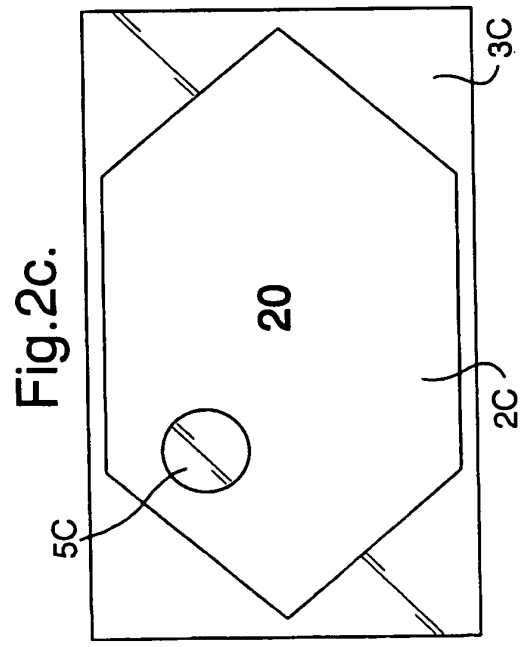
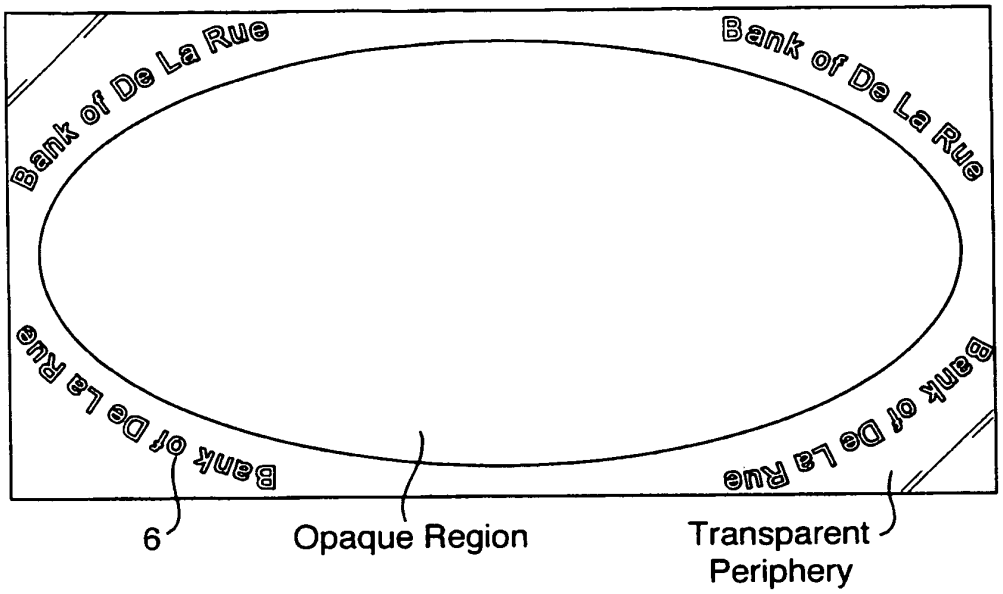


Fig.2c.

Fig.3.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6
Opaque Region
Transparent Periphery

Fig.4.

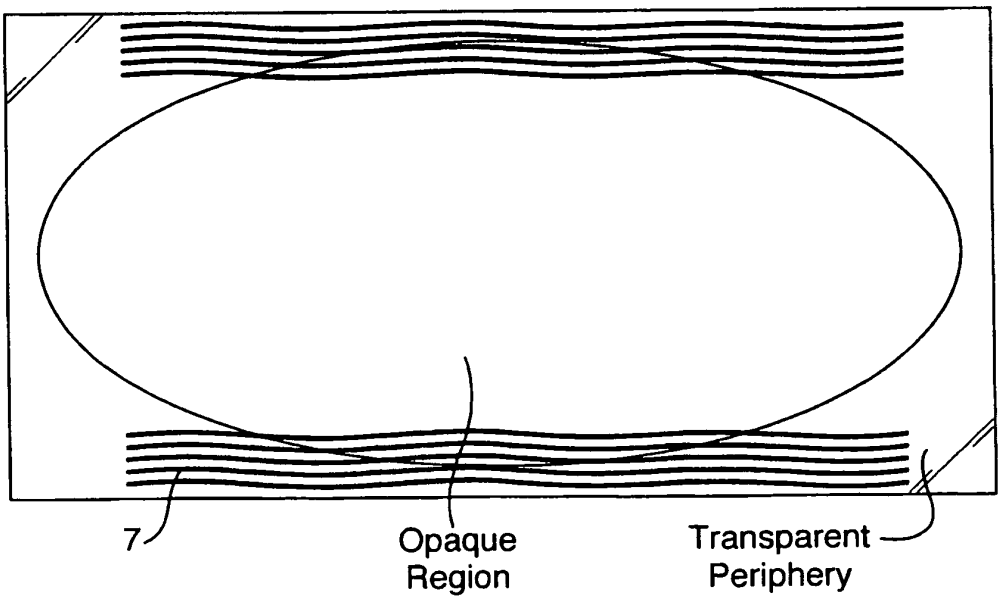

7
Opaque Region
Transparent Periphery

Fig.5a.

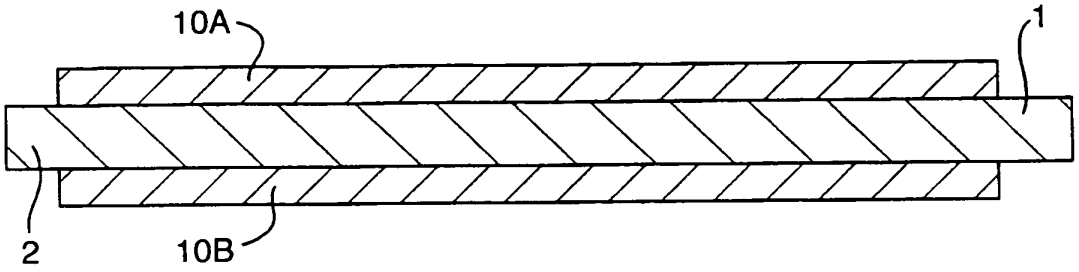
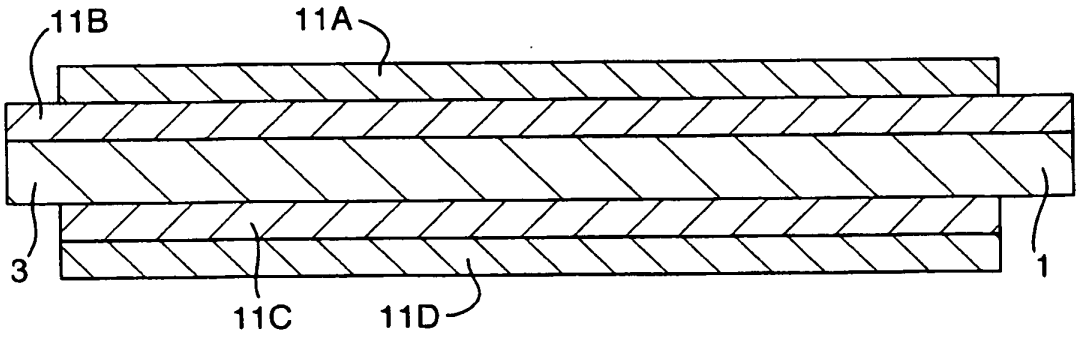


Fig.5b.



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